

## LIST OF PUBLICATIONS FOR PROJECT 1.1

Note—The Russian dosimetrists receive funds from the U.S. Department of Energy (in prior years funds were also provided for Project 1.1 by the U.S. National Aeronautics and Space Administration and the U.S. Environmental Protection Agency) for 60% support of their salary; the Federal Department of the Ministry of Health of the Russian Federation has provided through JCCRER Project 1.1 most of the remaining salary support. Some of the publications listed below have resulted from small, specific projects with a majority of funding from other sources; however, the work could not have been undertaken without the backbone support of JCCRER Project 1.1. The Russian Principal Investigator has managed effectively to combine the activities into a coherent project. In some cases the Russian dosimetrists of Project 1.1 have made the results of their work available to other projects without specific financial compensation, but the use of their results has been recognized through co-authorship of publications.

### ARTICLES IN PEER-REVIEWED JOURNALS

- Bauchinger, M.; Salassidis, K.; Braselmann, H.; Vozilova, A.; Pressl, S.; Stephan, G.; Snigiryova, G.; Kozheurov, V. P.; Akleyev, A. FISH-based analysis of stable translocations in a Techa River population. *Int. J. Radiat. Biol.* 73:605–612, 1998.
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- Degteva, M. O., Kozheurov, V. P.; Burmistrov, D. S.; Vorobyova, M. I.; Valchuk, V. V.; Bougrov, N. G.; Shishkina, H. A. An approach to dose reconstruction for the Urals population. *Health Phys.* 71:71–76; 1996.
- Degteva, M. O.; Kozheurov, V. P.; Tolstykh, E. I. Retrospective dosimetry related to chronic environmental exposure. *Radiat. Prot. Dosim.* 79:155–160; 1998.
- Degteva, M. O.; Vorobiova, M. I.; Kozheurov, V. P.; Tolstykh, E. I.; Anspaugh, L. R.; Napier, B. A. Dose reconstruction system for the exposed population living along the Techa River. *Health Phys.* 78:542–554; 2000.
- Degteva, M. O.; Kozheurov, V. P.; Tolstykh, E. I.; Vorobiova, M. I.; Anspaugh, L. R.; Napier, B. A.; Kovtun, A. N. The Techa River Dosimetry System: Methods for the reconstruction of internal dose. *Health Phys.* 79:24–35; 2000.
- Degteva, M. O.; Vorobiova, M. I.; Tolstykh, E. I.; Shagina, N. B.; Anspaugh, L. R.; Napier, B. A. Dosimetry of the Techa River System: Dose reconstruction for radiation consequences risk assessment. *Radiat. Safety Problems (Mayak Production Association Scientific Journal)* 1 4:36–46; 2000 (in Russian).
- Göksu, H. Y.; Heide, L. M.; Bougrov, N. G.; Dalheimer, A. R.; Meckbach, R.; Jacob, P. Depth-dose distribution in bricks determined by thermoluminescence and by Monte-Carlo calculation for external  $\gamma$ -dose reconstruction. *Appl. Radiat. Isot.* 47:433–440; 1996.

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\* Other sources have included the Commission of European Communities, the International Science and Technology Center, and the International Science Foundation.

- Haskell, E. H.; Hayes, R. B.; Romanyukha, A. A.; Kenner, G. H. Preliminary report on the development of a virtually non-destructive additive dose technique for EPR dosimetry. *Appl. Radiat. Isot.* 52:1065–1070; 2000.
- Koshta, A. A.; Wieser, A.; Ignatiev, E. A.; Bayankin, S.; Romanyukha, A.; Degteva M. O. New computer procedure for routine EPR-dosimetry on tooth enamel: Description and verification. *Appl. Radiat. Isot.* 52:1287–1290; 2000.
- Kossenko, M. M.; Degteva, M. O.; Vyushkova, O. V.; Preston, D. L.; Mabuchi, K.; Kozheurov, V. P. Issues in the comparison of risk estimates for the population in the Techa River Region and atomic bomb survivors. *Radiat. Res.* 148:54–63; 1997.
- Kossenko, M. M.; Akleyev, A. V.; Startsev, N. V.; Degteva, M. O. Epidemiological analysis of remote cancerogenesis effects on populations with chronic exposure to radiation in the Urals Region. *Intl. J. Radiat. Med.* 2:34–41; 1999 (in English and Russian)
- Kossenko, M. M.; Ostroumova, Y.; Akleyev, A.; Startsev, N.; Degteva, M.; Granath, F.; Hall, P. Mortality in the offspring of individuals living along the radioactively contaminated Techa River: A descriptive analysis. *Radiat. Environ. Biophys.* 39:219–225; 2000.
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- Shishkina, E. A.; Lyubashevskii, N. M.; Tolstykh, E. I.; Ignatiev, E. A.; Betenekova, T. A.; Nikiforov, S. V. A mathematical model for calculation of <sup>90</sup>Sr absorbed dose in dental tissues: Elaboration and comparison to EPR measurements. *Appl. Radiat. Isot.* 55:363–374; 2001.
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- Tolstykh, E. I., Degteva, M. O., Kozheurov, V. P., Burmistrov, D. S. Strontium transfer from maternal skeleton to the fetus estimated on the basis of the Techa River data. *Radiat. Prot. Dosim.* 79:307–310; 1998.
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- Vorobiova, M. I.; Degteva, M. O. Simple model for the reconstruction of radionuclide concentrations and radiation exposures along the Techa River. *Health Phys.* 77:142–149; 1999.
- Vorobiova, M. I.; Degteva, M. O.; Burmistrov, D. S.; Safranova, N. G.; Kozheurov, V. P.; Anspaugh, L. R.; Napier, B. A. Review of historical monitoring data on Techa River contamination. *Health Phys.* 76:605–618; 1999.

Wieser, A.; Romanyukha, A. A.; Degteva, M. O.; Kozheurov, V. P.; Petzold, G. Tooth enamel as a natural beta dosimeter for bone seeking radionuclides. *Radiat. Prot. Dosim.* 65:413–416; 1996.

## OTHER OPEN LITERATURE ARTICLES

- Anspaugh, L. R. An overview of dose reconstruction: Lessons learned from studies in the United States. In: Assessing health and environmental risks from long-term radiation contamination in Chelyabinsk, Russia. Washington: American Association for the Advancement of Science; 1997:3–19.
- Anspaugh, L. R., Akleyev, A. V.; Degteva, M. O.; Straume, T.; Napier, B. A. Interpretation of results of FISH assays when zero or only a few translocations are observed. In: Chronic radiation exposure: Possibilities of biological indication. Chelyabinsk: Urals Research Center for Radiation Medicine; 2000:111–112.
- Burmistrov, D. S.; Vorobiova, M. I.; Degteva, M. O.; Linkov, I.; Wilson, R. Radioactive contamination of the Techa River: Environmental records and multimedia modelling. In: Nuclear data for science and technology, Proceedings of an international conference. Bologna: Societa Italiana di Fisica II:1376–1380; 1997.
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- Degteva, M. O.; Kozheurov, V. P.; Tolstykh, E. I.; Vorobiova, M. I.; Anspaugh, L. R.; Napier, B. A. The Techa River Dosimetry System: Dose reconstruction for population risk analysis. In: Harmonization of radiation, human life and the ecosystem, Proceedings of 10<sup>th</sup> international congress on radiation protection. Hiroshima: International Radiation Protection Association; CD-ROM; Paper No. T-19(1)-4; 2000.
- Degteva, M. O.; Jacob, P.; Vorobiova, M. I.; Bougrov, N. G.; Akleyev, A. V.; Romanyukha, A. A.; Wieser, A.; Meckbach, R.; Göksu, H. Y.; Taranenko, V. A. Comparative analysis of

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- Degteva, M. O.; Kozheurov, V. P.; Tolstykh, E. I.; Vorobiova, M. I.; Anspaugh, L. R.; Napier, B. A. Evaluation of the stochastic effects of low-dose radiation: Dose reconstruction for the Techa River Cohort in Russia. In: Abstract volume, bioastronautics investigators' workshop. Houston: Universities Space Research Association; 2001:290–291.
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- Romanyukha A. A., Degteva M. O., Kozheurov V. P., Wieser A., Jacob P.; Vorobiova M. I.; Ignatiev E. A.; Shishkina E. A.; Koshta, A. A. Retrospective evaluation of external component of individual doses for Techa Riverside. In: Proceedings 1996 international congress on radiation protection. Seibersdorf: International Radiation Protection Association; ISBN 3-9500255-4-5; 1996, Vol. 3:111–113.
- Shagina, N. B.; Degteva, M. O.; Tolstykh, E. I. Uncertainty analysis of strontium retention in humans resulting from individual variability in metabolic parameters. In: Harmonization of radiation, human life and the ecosystem, Proceedings of 10<sup>th</sup> international congress on radiation protection. Hiroshima: International Radiation Protection Association; CD-ROM; Paper No. P-3a-128; 2000.
- Shved, V. A.; Shishkina, E. A. Assessment of tooth tissue dose rate coefficients from incorporated strontium-90 in EPR dose reconstruction for the Techa riverside population. In: Harmonization of radiation, human life and the ecosystem, Proceedings of 10<sup>th</sup> international congress on radiation protection. Hiroshima: International Radiation Protection Association; CD-ROM; Paper No. P-3a-212; 2000.
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- Tolstykh, E. I.; Degteva, M. O.; Peremislova, L. M.; Vorobiova, M. I.; Kozheurov, V. P. Dietary intake and <sup>90</sup>Sr contents in the residents of the East Urals Radioactive Trace. Forty-year study experience. *Intl. J. Radiat. Med.* 3:134 (in English) and 300 (in Russian); 2001.

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## **FINAL REPORT FOR THE FIRST PHASE OF PROJECT 1.1**

Degteva, M. O.; Anspaugh, L. R.; Napier, B. A.; Vorobiova, M. I.; Tolstykh, E. I.; Kozheurov, V. P.; Kozyrev, A. V.; Bougrov, N. G.; Kovtun, A. N.; Shagina, N. B.; Shishkina, E. A.; Tokareva, E. E.; Taranenko, V. A. Development of an improved dose reconstruction system for the general population affected by the operation of the Mayak Production Association. Final Report on Project 1.1. Chelyabinsk and Salt Lake City: Urals Research Center for Radiation Medicine and University of Utah; March 2000.

## **MILESTONE REPORTS FOR THE FIRST PHASE OF PROJECT 1.1**

(Enumeration corresponds to that specified in the proposal)

### **Milestone 1**

Vorobiova, M. I.; Degteva, M. O.; Burmistrov, D. S.; Safronova, N. G.; Kozheurov, V. P.; Anspaugh, L. R.; Napier, B. A. Analytical review of historical monitoring data and modeled concentrations of radionuclides in Techa River water and sediments at specific locations over time. Description of hydrological data and models employed. Chelyabinsk and Salt Lake City: Urals Research Center for Radiation Medicine and University of Utah; Final report for Milestone 1; December 1997.

### **Milestone 2**

Kozheurov, V. P.; Kovtun, A. N.; Degteva, M. O.; Anspaugh, L. R.; Napier, B. A. Calibration of whole-body counter SICH-9.1 for strontium-90, cesium-137 and potassium-40 using special phantoms. Chelyabinsk and Salt Lake City: Urals Research Center for Radiation Medicine and University of Utah; Final report for Milestone 2; October 1998.

### **Milestone 3**

Tolstykh, E. I.; Kozheurov, V. P.; Burmistrov, D. S.; Degteva, M. O.; Vorobiova, M. I.; Anspaugh, L. R.; Napier, B. A. Individual-body-burden histories and resulting internal organ doses evaluated on the basis of the Techa River Dosimetry System approach. Chelyabinsk and Salt Lake City: Urals Research Center for Radiation Medicine and University of Utah; Final report for Milestone 3; October 1998.

### **Milestone 4**

Bougrov, N. G.; Burmistrov, D. S.; Degteva, M. O.; Vorobiova, M. I.; Haskell, E.; Göksu, H. Y.; Jacob, P.; Anspaugh, L. R.; Napier, B. A. Environmental thermoluminescent dosimetry measurements and their comparison with values calculated on the basis of historical monitoring data. Chelyabinsk and Salt Lake City: Urals Research Center for Radiation Medicine and University of Utah; Final report for Milestone 4; January 1999.

### **Milestone 5**

Degteva, M. O.; Vyushkova, O. V.; Romanyukha, A. A. Feasibility analysis of the development of a special system for obtaining tooth samples from the Techa River residents. Chelyabinsk and Ekaterinburg: Urals Research Center for Radiation Medicine and Institute of Metal Physics; Final report for Milestone 5; July 1997.

### **Milestone 6**

Vorobiova, M. I.; Degteva, M. O.; Kozyrev, A. V.; Anspaugh, L. R.; Napier, B. A. External doses evaluated on the basis of the Techa River Dosimetry System approach. Chelyabinsk and Salt Lake City: Urals Research Center for Radiation Medicine and University of Utah; Final report for Milestone 6; May 1999

### **Milestone 8**

Degteva, M. O.; Anspaugh, L. R.; Napier, B. A.; Tolstykh, E. I.; Shagina, N. B.; Kozheurov, V. P.; Vorobiova, M. I.; Tokareva, E. E.; Shishkina, E. A. Analysis of the main factors contributing to uncertainty in internal dose from  $^{90}\text{Sr}$  and feasibility evaluation for reduction in uncertainty. Chelyabinsk and Salt Lake City: Urals Research Center for Radiation Medicine and University of Utah; Final report for Milestone 8; November 1999.

### **Milestone 11**

Napier, B. A.; Shagina, N. B.; Degteva, M. O.; Tolstykh, E. I.; Vorobiova, M. I.; Anspaugh, L. R. Preliminary uncertainty analysis for the doses estimated using the Techa River Dosimetry System – 2000. Chelyabinsk and Salt Lake City: Urals Research Center for Radiation Medicine and University of Utah; Final report for Milestone 11; March 2000.

## **OTHER PROJECT REPORTS FOR THE FIRST PHASE OF PROJECT 1.1**

### **Final Report on Feasibility Study**

Degteva, M. O., Drozhko, E.; Anspaugh, L. R.; Napier, B. A.; Bouville, A.; Miller, C. Dose reconstruction for the Urals population. Joint Coordinating Committee on Radiation Effects Research. Project 1.1—Final report. Livermore: Lawrence Livermore National Laboratory; UCRL-ID-123713; February 1996.

### **Final Report on EPR Dosimetry (replacement of cancelled Milestone 9 Report)**

Haskell, E. H. Retrospective dosimetry using electron paramagnetic resonance (EPR) and thermoluminescence (TL) techniques in contaminated areas of the former Soviet Union. Final report of work performed at the Center of Applied Dosimetry. Salt Lake City: University of Utah; September 1998.

## **MILESTONE REPORTS FOR THE SECOND PHASE OF PROJECT 1.1**

(Enumeration corresponds to that specified in the proposal)

### **Milestone 1**

Kozheurov, V. P.; Zalyapin, V. I.; Shagina, N. B.; Tokareva, E. E.; Degteva, M. O.; Tolstykh, E. I.; Anspaugh, L. R.; Napier, B. A. Statistical analysis of individual dosimetric data and the evaluation of uncertainties in instrumental techniques used for <sup>90</sup>Sr-body burden evaluation (whole body count and tooth-beta count). Chelyabinsk and Salt Lake City: Urals Research Center for Radiation Medicine and University of Utah; Final report for Milestone 1; September 2000.

### **Milestone 2**

Shishkina, E. A.; Shved, V. A.; Degteva, M. O.; Tolstykh, E. I.; Ivanov, D. V.; Bayankin, S. N.; Anspaugh, L. R.; Napier, B. A.; Wieser, A.; Jacob, P. Description of the computer database “tooth” and discussion of requirements for EPR measurements to support a validation study of external doses calculated by use of the Techa River Dosimetry System–2000. Chelyabinsk and Salt Lake City: Urals Research Center for Radiation Medicine and University of Utah; Final report for Milestone 2; April 2001.

## **PROGRESS REPORTS**

### **December 1996—Original Proposal**

Degteva, M. O.; Drozhko, E.; Anspaugh, L.; Napier, B.; Bouville, A.; Miller, C. Development of an improved dose reconstruction system for the general population affected by the operation of the Mayak Production Association. Proposal (protocol) for continuation of

Joint Coordinating Committee on Radiation Effects Research Project 1.1. Livermore and Chelyabinsk: Lawrence Livermore National Laboratory and Urals Research Center for Radiation Medicine; UCRL-PROP-126084; December 1996.

#### **June 1997—Revised List of Tasks and Milestones**

Degteva, M. O.; Anspaugh, L.; Napier, B.; Bouville, A.; Miller, C. Development of an improved dose reconstruction system for the general population affected by the operation of the Mayak Production Association. Update on Project 1.1 tasks and milestones. Chelyabinsk and Livermore: Urals Research Center for Radiation Medicine and Lawrence Livermore National Laboratory; June 1997.

#### **March 1998 Progress Report**

Degteva, M. O., Anspaugh, L.; Napier, B.; Bouville, A.; Miller, C. Development of an improved dose reconstruction system for the general population affected by the operation of the Mayak Production Association. Progress report on Project 1.1. Chelyabinsk and Salt Lake City: Urals Research Center for Radiation Medicine and University of Utah; March 1998.

#### **October 1998 Progress Report**

Degteva, M. O.; Anspaugh, L.; Napier, B.; Bouville, A.; Miller, C. Development of an improved dose reconstruction system for the general population affected by the operation of the Mayak Production Association. Progress report on Project 1.1. Chelyabinsk and Salt Lake City: Urals Research Center for Radiation Medicine and University of Utah; October 1998.

#### **March 1999 Progress Report**

Degteva, M. O.; Anspaugh, L.; Napier, B.; Bouville, A.; Miller, C. Development of an improved dose reconstruction system for the general population affected by the operation of the Mayak Production Association. Progress report on Project 1.1. Chelyabinsk and Salt Lake City: Urals Research Center for Radiation Medicine and University of Utah; March 1999.

#### **July 1999 Unscheduled Progress Report**

Degteva, M. O.; Anspaugh, L.; Napier, B.; Bouville, A.; Miller, C. Development of an improved dose reconstruction system for the general population affected by the operation of the Mayak Production Association. Unscheduled progress report on Project 1.1. Chelyabinsk and Salt Lake City: Urals Research Center for Radiation Medicine and University of Utah; July 1999.

### **September 1999 Progress Report**

Degteva, M. O.; Anspaugh, L.; Napier, B.; Bouville, A.; Miller, C. Development of an improved dose reconstruction system for the general population affected by the operation of the Mayak Production Association. Progress report on Project 1.1. Chelyabinsk and Salt Lake City: Urals Research Center for Radiation Medicine and University of Utah; September 1999.

### **June 2000—Continuation Proposal for the Second Phase of Project 1.1**

Degteva, M. O.; Anspaugh, L.; Napier, B. Further studies on uncertainty, confounding, and validation of the doses in the Techa River Dosimetry System. Proposal for the continuation of Project 1.1. Chelyabinsk and Salt Lake City: Urals Research Center for Radiation Medicine and University of Utah; June 2000.

### **October 2000 Progress Report**

Degteva, M. O.; Anspaugh, L.; Napier, B. Further studies on uncertainty and validation of the doses in the Techa River Dosimetry System. Progress report on Project 1.1. Chelyabinsk and Salt Lake City: Urals Research Center for Radiation Medicine and University of Utah; October 2000.

### **April 2001 Progress Report**

Degteva, M. O.; Anspaugh, L.; Napier, B. Further studies on uncertainty and validation of the doses in the Techa River Dosimetry System. Progress report on Project 1.1. Chelyabinsk and Salt Lake City: Urals Research Center for Radiation Medicine and University of Utah; April 2001.